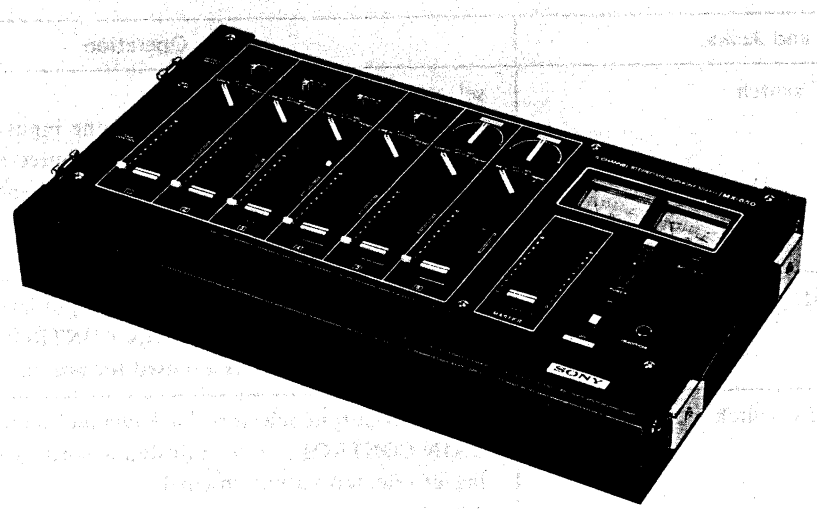
MX-650

E Model
UK Model
AEP Model



6-CHANNEL MIXER

SPECIFICATIONS

Power Requirement: DC 12 V size "C" battery (1.5 V) x 8
AC operation with the use of Sony AC Power Adaptor AC-12 (optional)

Power Consumption: 0.45 W

Battery Life: Approx. 45 hours of continuous operation (with Sony long-life size "C" batteries)

Inputs:
- MICROPHONE (phone type) 6
  sensitivity -72 dB (0.2 mV)
  low impedance
- LINE IN* (phono type) 6
  sensitivity -22 dB (60 mV)
  input impedance 100 kΩ
- PHONO* (phono type) 6
  sensitivity -51 dB (2.2 mV)
  input impedance 50 kΩ
  including RIAA equalization network
- CASCADE IN (phono type) 2
  sensitivity -5 dB (0.435 V)
  input impedance 50 kΩ

Outputs:
- LOW (phone type) 2
  rated output level -60 dB (0.775 mV)
  load impedance more than 600 Ω
- HIGH (phono type) 2
  rated output level -5 dB (0.435 V)
  load impedance more than 10 kΩ
- HEADPHONE (binaural type) 1
  rated output level -24 dB (49 mV)
  load impedance 8 Ω

Frequency Response: 30 - 25,000 Hz

Distortion: 0.5 %

Signal-to-Noise Ratio: 60 dB

Dimensions: Including projecting parts and controls.
Approx. 452(w) x 83(h) x 252(d) mm
(17⅞ x 3⅜ x 10 inches)

Weight: Approx. 4.3 kg (9 lb 8 oz)
(with batteries included)

* MX-650 uses the same input for line and phono input connection. The mixer circuit will be switched by setting the input selector to either "LINE IN" or "PHONO".

SONY®
SERVICE MANUAL

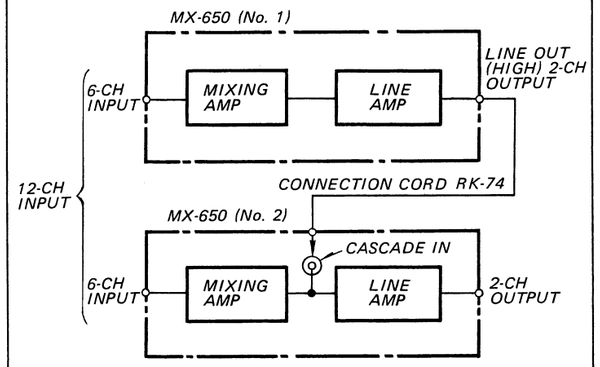
SECTION 1
OUTLINE

1-1. DESCRIPTION

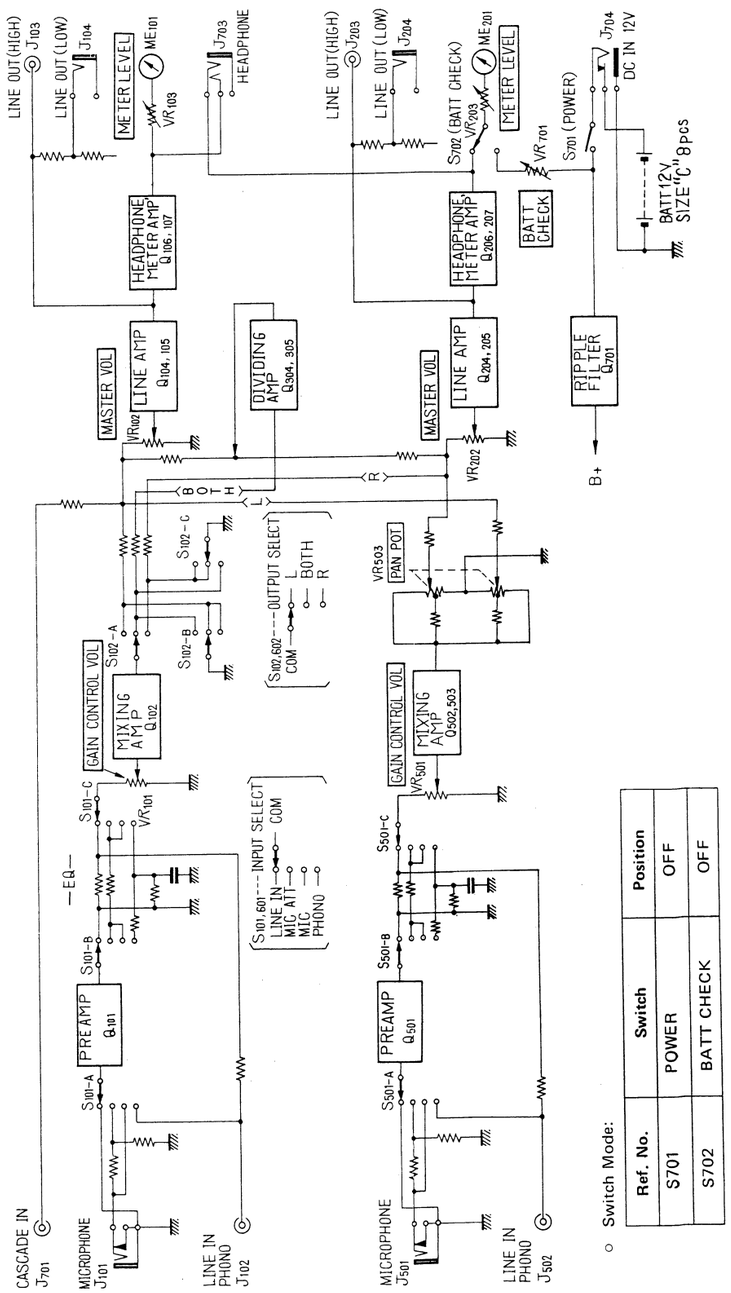
MX-650 is a 6-channel mixer provided with 2-channel outputs. This model contains amplifiers to cover mixing loss and to improve S/N ratio. Power supply is an internal or external 12 V dc.

Switches, Controls and Jacks	Operation
1. INPUT SELECT switch	selectors of input source MIC ..... for microphone input source LINE IN/PHONO .... for line input source or record player 20 dB microphone input attenuator to prevent distortion caused by excessive input level It is effective for microphone placement close to the source.
2. GAIN CONTROL	It is possible to control each channel input level of 6-channel. Double horizontal lines of GAIN CONTROL indicate the best usable condition. Cursors are used for preset.
3. OUTPUT SELECT switch	2-channel output selectors for 6-channel inputs GAIN CONTROL can be adjusted according to VU meter reading of selected output channel. When any output channel selector is set to BOTH position, the same signal feeds to output channels 1 and 2. This feature facilitates "center-mixing" of a monaural sound source such as announcements or a single instrument between L-and R-channel microphones.
4. MASTER control	This control simultaneously adjusts four overall output levels. After finishing level set with each GAIN CONTROL, slide the MASTER control to 10 at record starting. After recording, slide the MASTER control gradually down to 0. It is usually used at 10 position.
5. HEADPHONE jack	This jack is to be used for level setting or record monitoring. No output signal appears when MASTER control is set to 0.
6. INPUT and OUTPUT jacks	INPUT MICROPHONE x 6 LINE IN/PHONO x 6 CASCADE IN x 2 OUTPUT LINE OUT (LOW) x 2 LINE OUT (HIGH) x 2 Normal LINE OUT (LOW) -60dB (0.775mV) Normal LINE OUT (HIGH) -5dB (0.435V)

Switches, Controls and Jacks	Operation
7. CASCADE IN jack	Two MX-650 mixers can be connected in parallel by using CASCADE IN jacks to obtain 12-channel inputs and 2-channel outputs.



1-2. BLOCK DIAGRAM



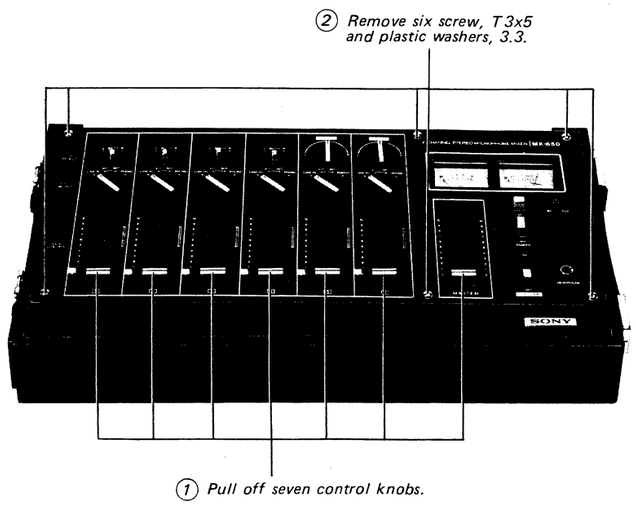
○ Switch Mode:

Ref. No.	Switch	Position
S701	POWER	OFF
S702	BATT CHECK	OFF

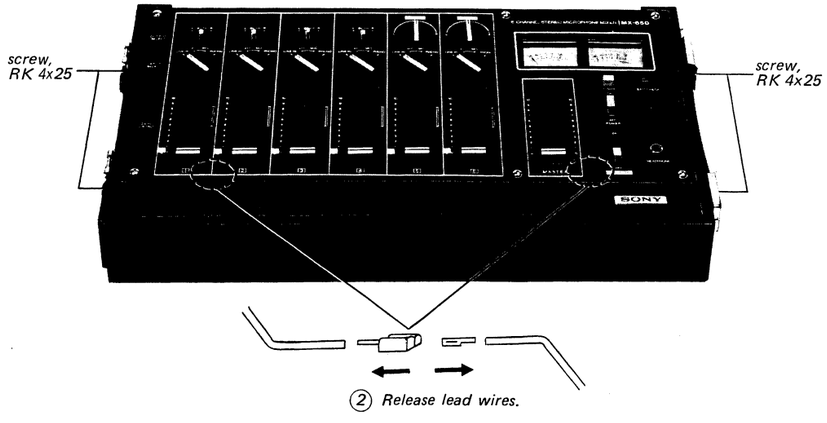
SECTION 2
DISASSEMBLY

2-1. PANEL REMOVAL

Note: Perform "ADJUSTMENTS" after removing the panel.



2-2. LOWER CASE REMOVAL



SECTION 3
ADJUSTMENTS

Test Equipment/Tools Required:

VTVM
Audio oscillator (af osc)
Attenuator
Resistors ..... 300 Ω, 600 Ω, 10 kΩ, 100 kΩ (¼ W)
Regulated dc power supply

Normal Input Level (Frequency: 1 kHz)

	MICROPHONE	LINE IN/ PHONO
impedance	300 Ω	10 kΩ
input level	−60 dB (0.77 mV)	−10 dB (0.25 V)

Normal Output Level (Frequency: 1 kHz)

	LINE OUT (HIGH)	LINE OUT (LOW)
load impedance	100 kΩ	3.9 kΩ
Output level	−5 dB (0.435 V)	−60 dB (0.77 mV)

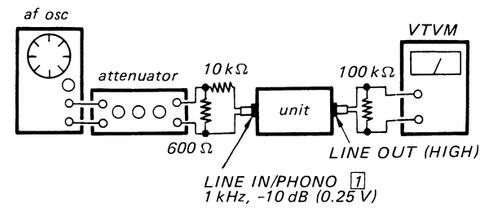
1. VU Meter Calibration

Settings:

MASTER control:	10
INPUT SELECT switch:	LINE IN
OUTPUT SELECT switch:	L, R
CAL TONE switch:	ON

Procedure:

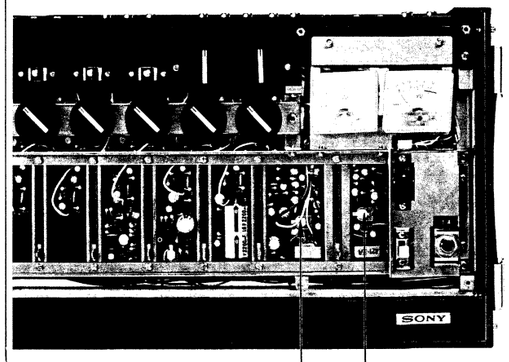
1.



Adjust GAIN CONTROL for −5 dB (0.435 V) VTVM reading.

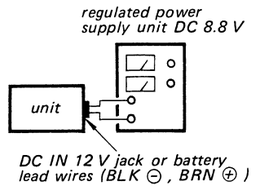
2. Adjust VR103 (L-CH) and VR203 (R-CH) for 0 VU meter reading.

Adjustment Locations:



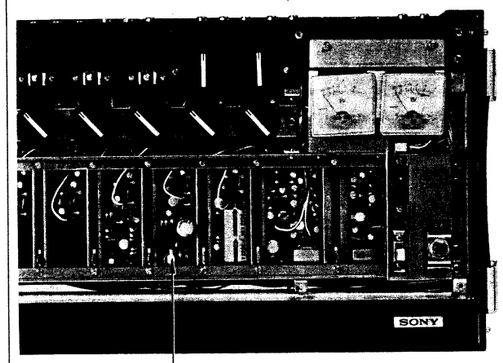
2. BATT CHECK Calibration

Procedure:



With BATT CHECK button depressed, adjust VR701 for 0 VU meter reading on right VU meter (ME201).

Adjustment Location:



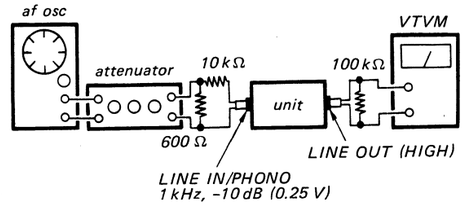
3. Level Adjustment

Settings:

MASTER control:	10
INPUT SELECT switch:	LINE IN
OUTPUT SELECT switch:	L, R
CAL TONE switch:	ON

Procedure:

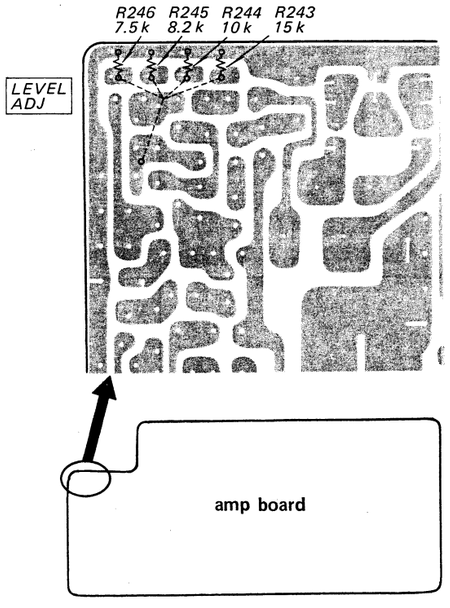
1.



Adjust GAIN CONTROL for -5 dB (0.435 V) VTVM reading.

2. Adjust resistance value by changing the pattern connection so that the output level of R-CH becomes equal to that of L-CH.

Adjustment Location:



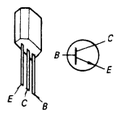
SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM

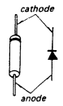
— Conductor Side —

Q101~601
Q102~602
Q104~304
} 2SC631

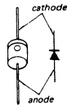
Q105~107
Q205~207
Q305, 503, 603
Q701~703
} 2SC633



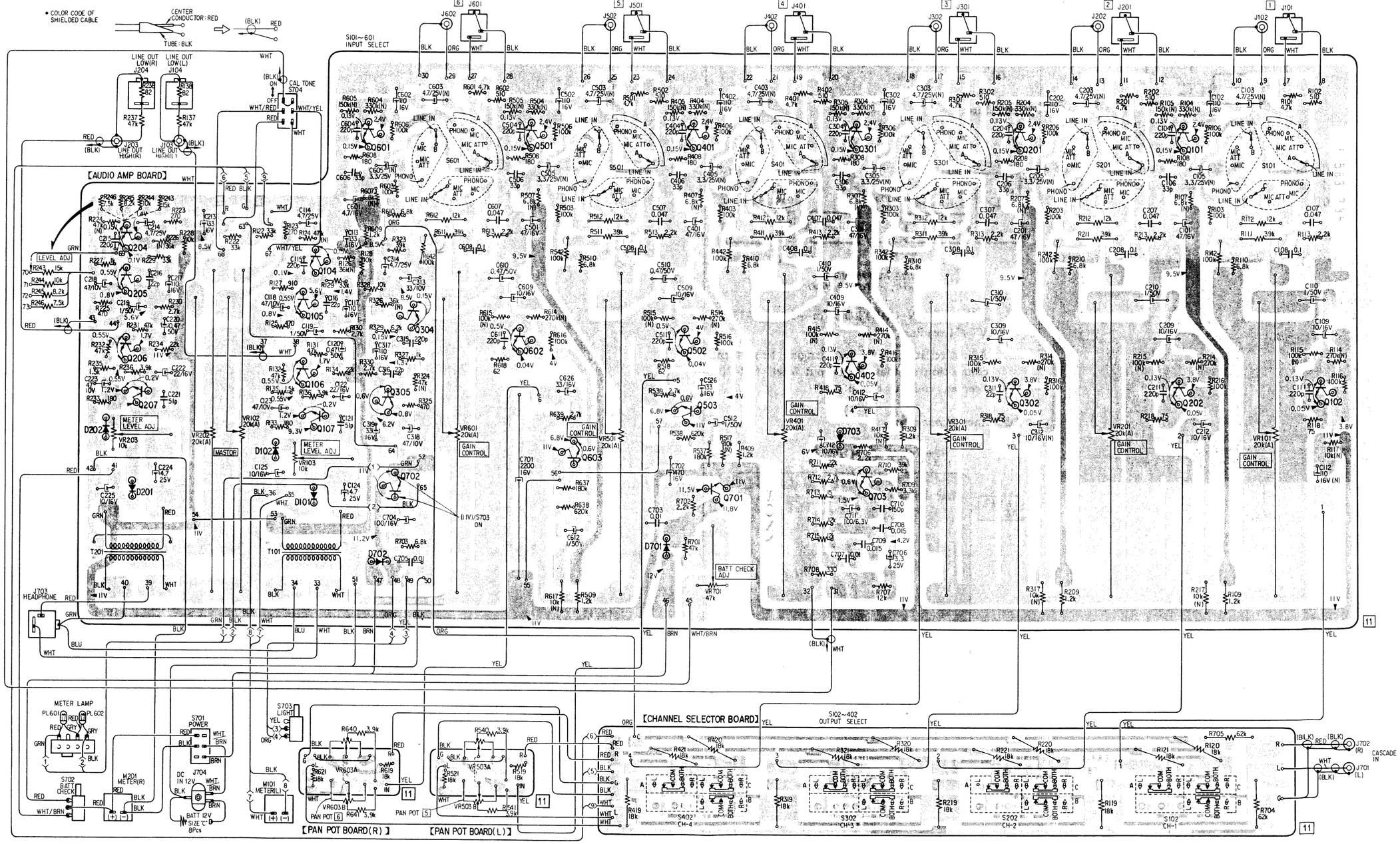
D101, 102
D201, 202
} 1T22
D703: 1S331



D701, 702: 10D-05

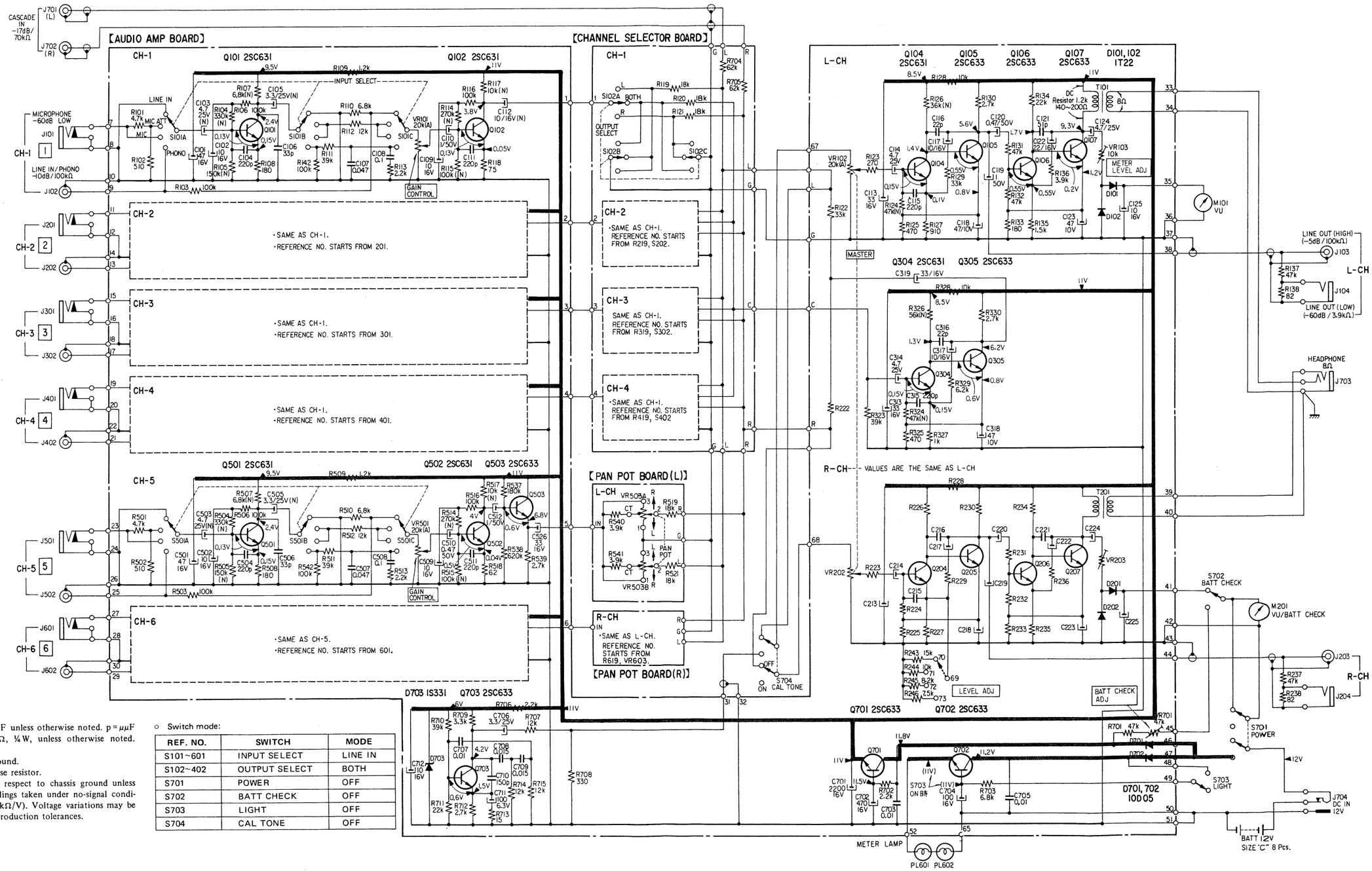


: B+



| Q,D | | |

4-2. SCHEMATIC DIAGRAM



Note:

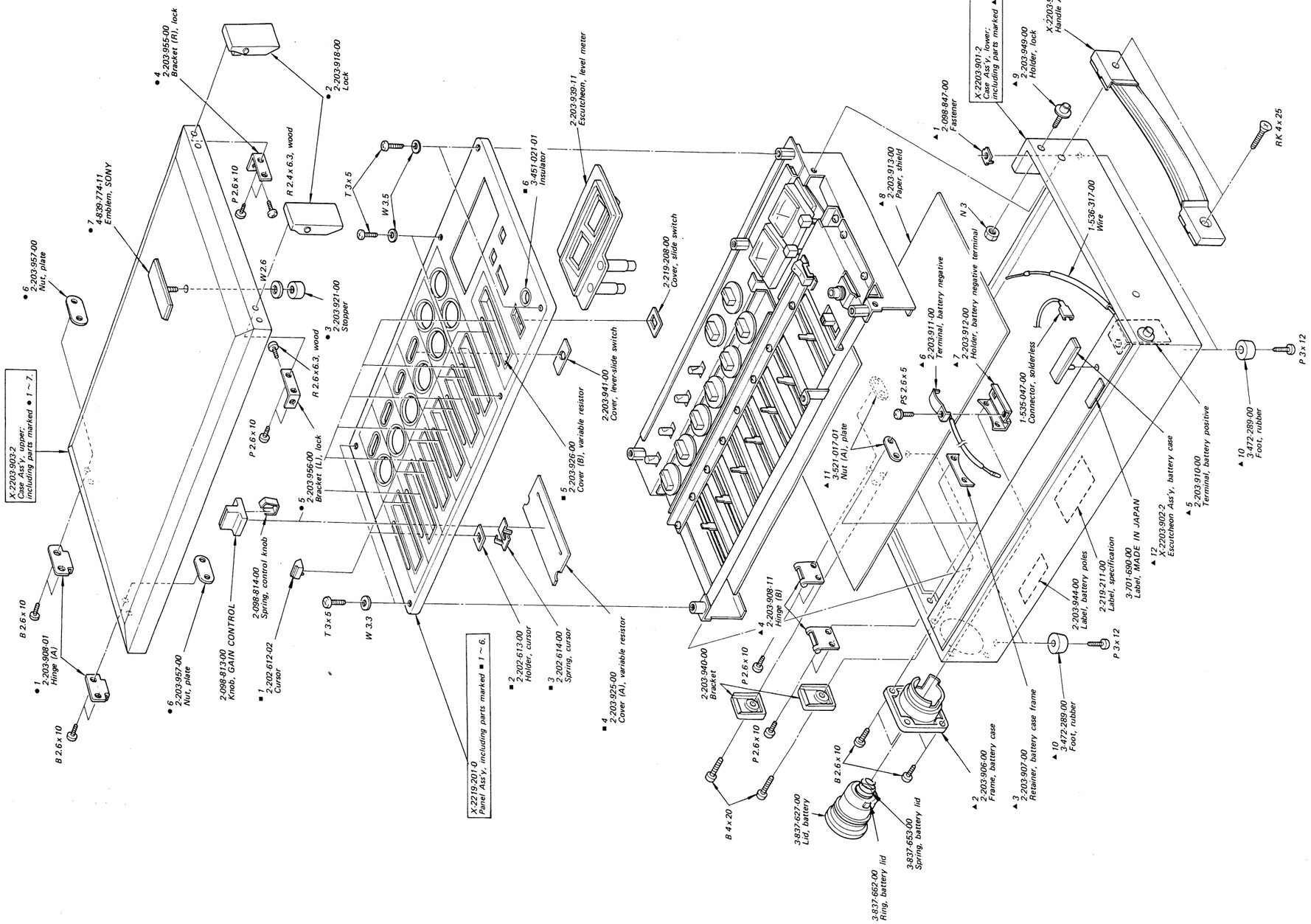
- All capacitors are in μF unless otherwise noted. p = μμF
- All resistors are in Ω, ¼W, unless otherwise noted. k = 1,000 M = 1,000 k
- ⏚ indicates chassis ground.
- (N) indicates a low-noise resistor.
- Voltages are DC with respect to chassis ground unless otherwise noted. Readings taken under no-signal conditions with a VOM (20 kΩ/V). Voltage variations may be noted due to normal production tolerances.
- ——— : B+

- Switch mode:

REF. NO.	SWITCH	MODE
S101~601	INPUT SELECT	LINE IN
S102~402	OUTPUT SELECT	BOTH
S701	POWER	OFF
S702	BATT CHECK	OFF
S703	LIGHT	OFF
S704	CAL TONE	OFF

SECTION 5
EXPLODED VIEWS

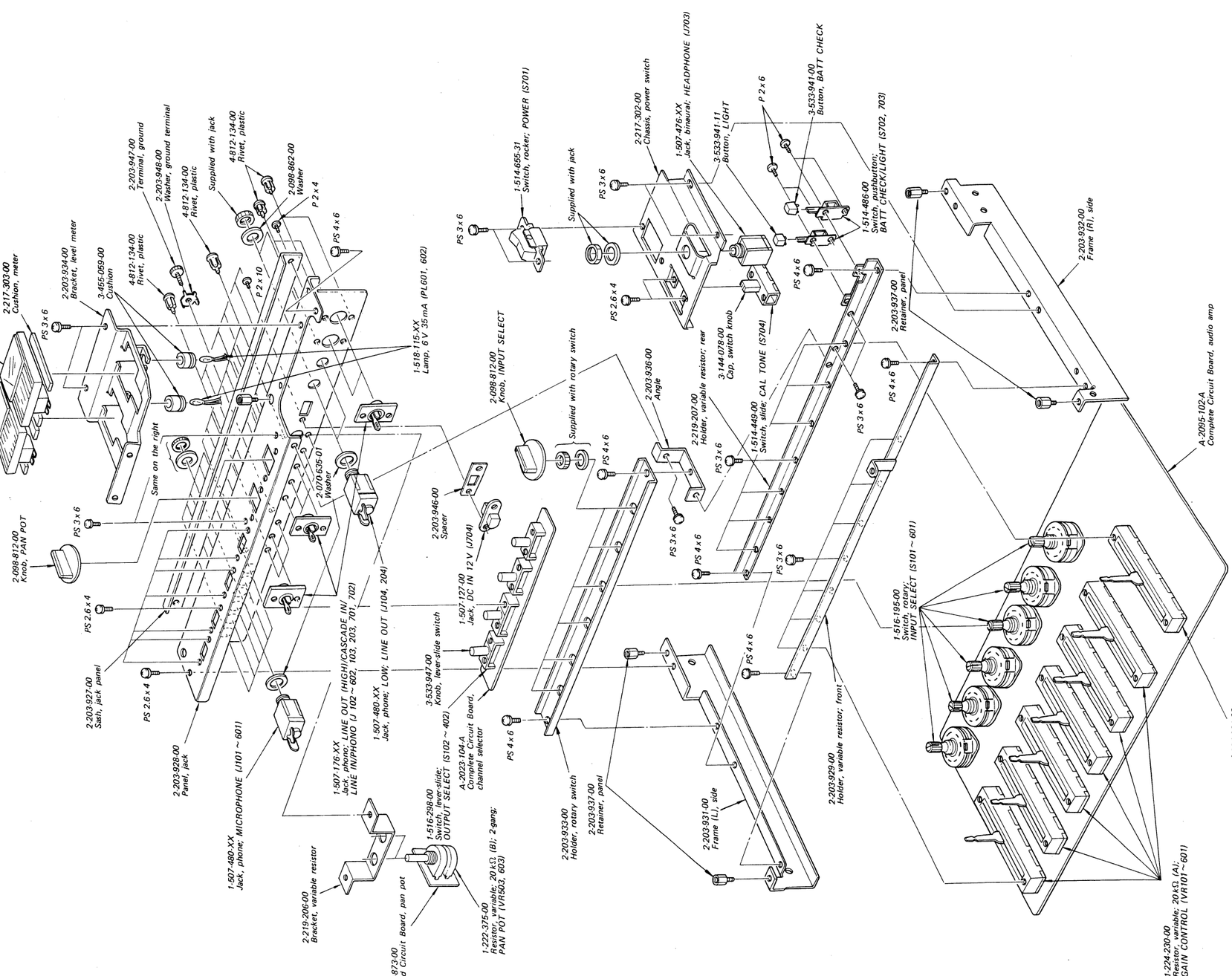
5-1.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

5-2.


1-520-114-71 Meter, level (ME201)
2-217-303-00 Cushion, meter
PS 3 x 6
2-203-934-00 Bracket, level meter
3-455-059-00 Cushion
4-812-134-00 Rivet, plastic
2-203-947-00 Terminal, ground
2-203-948-00 Washer, ground terminal
4-812-134-00 Rivet, plastic
Supplied with jack
4-812-134-00 Rivet, plastic
2-098-862-00 Washer
P 2 x 4
P 2 x 10
PS 4 x 6
1-520-114-61 Meter, level (ME101)
Same on the right
2-098-812-00 Knob, PAN POT
PS 3 x 6
PS 2.6 x 4
2-203-927-00 Sash, jack panel
PS 2.6 x 4
2-203-928-00 Panel, jack
1-507-480-XX Jack, phone; MICROPHONE (J101 ~ 601)
1-518-115-XX Lamp, 6 V 35 mA (PL601, 602)
2-070-635-01 Washer
2-098-812-00 Knob, INPUT SELECT
Supplied with rotary switch
2-203-946-00 Spacer
1-507-176-XX Jack, phone; LINE OUT (HIGH)/CASCADE IN/ LINE IN/PHONO (J 102 ~ 602, 103, 203, 701, 702)
1-507-480-XX Jack, phone; LOW; LINE OUT (J104, 204)
2-219-206-00 Bracket, variable resistor
1-582-873-00 Printed Circuit Board, pan pot
1-516-298-00 Switch, lever slide; OUTPUT SELECT (S102 ~ 402)
1-222-375-00 Resistor, variable; 20 kΩ (B); 2 gang; PAN POT (VR503, 603)
PS 4 x 6
2-203-936-00 Angle
2-219-207-00 Holder, variable resistor; rear
PS 3 x 6
1-514-655-31 Switch, rocker; POWER (S701)
PS 3 x 6
Supplied with jack
PS 2.6 x 4
2-217-302-00 Chassis, power switch
PS 3 x 6
1-507-476-XX Jack, binaural; HEADPHONE (J703)
3-533-941-11 Button, LIGHT
P 2 x 6
3-533-941-00 Button, BATT CHECK
PS 4 x 6
1-514-486-00 Switch, pushbutton; BATT CHECK/LIGHT (S702, 703)
3-144-078-00 Cap, switch knob
1-514-449-00 Switch, slide; CAL TONE (S704)
PS 3 x 6
PS 4 x 6
2-203-937-00 Retainer, panel
2-203-932-00 Frame (R), side
A-2095-102-A Complete Circuit Board, audio amp
PS 3 x 6
PS 4 x 6
PS 3 x 6
PS 4 x 6
1-507-127-00 Jack, DC IN 12 V (J704)
3-533-947-00 Knob, lever slide switch
A-2023-104-A Complete Circuit Board, channel selector
PS 4 x 6
2-203-933-00 Holder, rotary switch
2-203-937-00 Retainer, panel
2-203-931-00 Frame (L), side
2-203-929-00 Holder, variable resistor; front
1-516-195-00 Switch, rotary; INPUT SELECT (S101 ~ 601)
1-224-231-00 Resistor, variable; 20 kΩ (A); 2 gang; MASTER (VR102, 202)
1-224-230-00 Resistor, variable; 20 kΩ (A); GAIN CONTROL (VR101 ~ 601)

Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (–) = slotted head

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
		CIRCUIT BOARDS
	A-2095-102-A	Audio Amp, complete
	A-2023-104-A	Channel Selector, complete
	1-582-873-00	Pan-pot
		SEMICONDUCTORS
		Transistors
Q101~601, Q102~602, Q104~304		2SC631
Q105~107, Q205~207, 305,503,603, 701~703		2SC633
		Diodes
D101,201, D102,202		1T22
D701,702		10D05
D703		1S331
		TRANSFORMERS
T101,201	1-427-359-00	Output
		CAPACITORS

All capacitors are in μF unless otherwise indicated.
50 or less working volts are omitted except for electrolytic type. (elect = electrolytic, p = μμF)

Ref. No.	Part No.			Description
C101,201	1-121-409-11	47	16 V	elect
C102,202	1-121-651-11	10	16 V	elect
C103,203	1-121-915-11	4.7	25 V	elect
C104,204	1-107-139-11	220 p		silvered mica
C105,205	1-121-913-11	3.3	25 V	elect
C106,206	1-107-119-11	33 p		silvered mica
C107,207	1-105-521-12	0.047		mylar
C108,208	1-105-525-12	0.1		mylar
C109,209	1-121-651-11	10	16 V	elect
C110,210	1-121-391-11	1	50 V	elect
C111,211	1-107-139-11	220 p		silvered mica
C112,212	1-121-916-11	10	16 V	elect
C113,213	1-121-404-11	33	16 V	elect
C114,214	1-121-395-11	4.7	25 V	elect
C115,215	1-107-139-11	220 p		silvered mica
C116,216	1-107-115-11	22 p		silvered mica
C117,217	1-121-651-11	10	16 V	elect
C118,218	1-121-352-11	47	10 V	elect
C119,219	1-121-391-11	1	50 V	elect
C120,220	1-121-726-11	0.47	50 V	elect
C121,221	1-107-124-11	51 p		silvered mica
C122,222	1-121-479-11	22	16 V	elect
C123,223	1-121-352-11	47	10 V	elect
C124,224	1-121-395-11	4.7	25 V	elect
C125,225	1-121-651-11	10	16 V	elect
C301,401	1-121-409-11	47	16 V	elect
C302,402	1-121-651-11	10	16 V	elect
C303,403	1-121-915-11	4.7	25 V	elect
C304,404	1-107-139-11	220 p		silvered mica
C305,405	1-121-913-11	3.3	25 V	elect
C306,406	1-107-119-11	33 p		silvered mica
C307,407	1-105-521-12	0.047		mylar
C308,408	1-105-525-12	0.1		mylar
C309,409	1-121-651-11	10	16 V	elect
C310,410	1-121-391-11	1		elect
C311,411	1-107-139-11	220 p		silvered mica
C312,412	1-121-916-11	10	16 V	elect
C313	1-121-404-11	33	25 V	elect
C314	1-121-395-11	4.7	25 V	elect
C315	1-107-139-11	220 p		silvered mica
C316	1-107-115-11	22 p		silvered mica
C317	1-121-651-11	10	16 V	elect
C318	1-121-352-11	47	10 V	elect
C319	1-121-404-11	33	25 V	elect
C501,601	1-121-409-11	47	16 V	elect
C502,602	1-121-651-11	10	16 V	elect
C503,603	1-121-915-11	4.7	25 V	elect
C504,604	1-107-139-11	220 p		silvered mica
C505,605	1-121-913-11	3.3	25 V	elect
C506,606	1-107-119-11	33 p		silvered mica
C507,607	1-105-673-12	0.047		mylar
C508,608	1-105-525-12	0.1		mylar
C509,609	1-121-651-11	10	16 V	elect
C510,610	1-121-726-11	0.47	50 V	elect
C511,611	1-107-139-11	220 p		silvered mica
C512,612	1-121-391-11	1	50 V	elect
C526,626	1-121-404-11	33	25 V	elect
C701	1-119-140-11	2200	16 V	elect
C702	1-121-426-11	470	16 V	elect
C703	1-105-673-12	0.01		mylar
C704	1-121-415-11	100	16 V	elect
C705	1-105-673-12	0.01		mylar
C706	1-121-392-11	3.3	25 V	elect
C707	1-105-673-12	0.01		mylar
C708,709	1-105-675-12	0.015		mylar
C710	1-107-135-11	150 p		silvered mica
C711	1-121-413-11	100	6.3 V	elect
C712	1-121-651-11	10	16 V	elect
				RESISTORS

All resistors are in ohms. Regular type ±5 % ¼ W carbon and composition resistors are omitted. Check schematic diagram for the resistance values. k = 1,000, M = 1,000 k

Ref. No.	Part No.	Description
VR101~601	1-224-230-00	20 k (A), variable; GAIN CONTROL
VR102,22	1-224-231-00	20 k (A), variable; 2-gang; MASTER
VR103,203	1-222-752-00	10 k (A), adjustable
VR503,603	1-222-375-00	20 k (B), variable; 2-gang; PAN POT
VR701	1-222-765-00	47 k, adjustable
		SWITCHES
S101~601	1-516-195-00	Rotary, INPUT SELECT
S102~402	1-516-298-00	Lever-slide, OUTPUT SELECT
S701	1-514-655-31	Rocker, POWER
S702,703	1-514-486-00	Pushbutton, BATT CHECK/LIGHT
S704	1-514-449-00	Slide, CAL TONE
		JACKS
J101~601	1-507-480-XX	Phone, MICROPHONE
J102~602, J103,203, J701,702	1-507-176-XX	Phono, LINE OUT (HIGH)/CASCADE IN/LINE IN/PHONO
J104,204	1-507-480-XX	Phone, LINE OUT (LOW)
J703	1-507-476-XX	Binaural, HEADPHONE
J704	1-507-127-00	DC IN 12 V
		MISCELLANEOUS
M101	1-520-114-61	Meter, level
M201	1-520-114-71	Meter, level
PL601,602	1-518-115-XX	Lamp, 6 V 35 mA
	1-535-047-00	Connector, solderless
	1-536-317-00	Wire
	1-536-397-00	Terminal Strip, 2L1
		ACCESSORIES
	1-528-026-00	Battery, size "C"
	1-534-049-31	Cord, connection; RK-74
	3-701-363-00	Label, tack
	3-780-570-11	Manual, instruction
	3-793-520-82	Card, guarantee (UK model)

SECTION 7
HARDWARE

Part No.	*Description*
	Screws
	All screws are Phillips (cross recess) type unless otherwise indicated.
7-621-255-29	P 2 x 4
7-621-259-69	P 2.6 x 10
7-621-559-63	K 2.6 x 10
7-621-773-87	B 2.6 x 10
7-621-841-46	R 2.4 x 6.3, wood
7-621-843-29	R 3.1 x 13, wood
7-628-253-03	PS 2 x 5
7-628-254-03	PS 2.6 x 5
7-629-100-13	R 1 x 6
7-682-128-05	P 2 x 10
7-682-150-05	P 3 x 12
7-682-367-04	PK 4 x 25
7-682-446-05	T 3 x 5
7-682-566-05	B 4 x 20
7-682-633-01	PS 2.6 x 4
7-682-647-01	PS 3 x 6
7-682-660-01	PS 4 x 6
7-685-145-23	P 3 x 6, self-tapping
	Washers
7-623-108-09	3 (small)
7-623-205-12	2, spring
7-623-208-12	3, spring
7-623-315-01	
7-623-908-04	3.3 x 8
7-622-105-05	Nut 2
7-684-013-01	Nut 3
7-684-013-11	